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Ministry vessel surveyed

Visitors to the July meeting of the International Joint Commission in Windsor included from left, Ontario Environment Minister George Kerr, Russel Train, Administrator United States Environmental Protection Agency and then President of the Privy Council, Mitchell Sharp. (For the complete story on IJC see pages 10-11.)

ENVIRONMENT ONTARIO LEGACY

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Refillable soft drinks required by law

New controls set for bottles

A new regulation announced recently by Ontario Environment Minister George A. Kerr ensures province-wide availability and use of carbonated soft drinks in refillable containers and will effectively reduce the use of environmentally undesirable non-refillable containers.

The regulation under The Environmental Protection Act requires the display and sale of refillable bottles wherever soft drinks are sold and establishes a mandatory deposit and cash refund on all refillable soft

drink containers. It also bans soft drink and beer cans with detachable pull-tab openers.

What this means to the consumer

Effective October 1, 1976, the regulation will require retail vendors to accept the return of clean, intact refillable bottles up to a limit of 48 per person per day and to refund in cash a minimum mandatory deposit of 10 cents on individual size bottles and 20 cents on family sizes.

Effective March 1, 1977, soft drink cans with detachable openers will be banned from use in Ontario, with a similar ban on this type of beer can to be effective July 1, 1977. Distributors and retailers will be allowed a reasonable time to clear existing stocks.

Effective April 1, 1977, a retailer may not offer non-refillables unless he also offers the same sizes, flavors and brands in refillable containers.

Effective April 1, 1977, non-refillable soft drink containers smaller than 480 milliliters (17 ounces) will be prohibited on licenced premises. This, in effect, requires bars and taverns to serve soft drinks in either refillable containers or

carafes for mixed drinks and eliminates the throwaway split common in premises selling alcoholic beverages.

Effective April 1, 1978, only five sizes of refillable carbonated soft drink containers will be manufactured in Ontario — 200 milliliters (ml) for use on licenced premises only, 300 ml, 750 ml, 1 liter and 1.5 liters — roughly equivalent to 7 ounces, 105 ounces, 26.5 ounces, 35.5 ounces and 53.5 ounces. However, a retailer may sell only three of these sizes in any given brand and flavor.

Incentive Act nets \$12 million

Ontario's Pollution Abatement Incentive Act provided a total of \$12,234,323 in financial incentive for the installation of pollution control equipment from 1970 until the act expired in April of 1976.

An estimated \$7 million more is expected to be paid as remaining outstanding applications are processed by Ministry of the Environment staff.



During tour of Kawartha weed harvesting project diver gathered Chemung Lake milfoil for study by Environment Minister George Kerr, right. Looking on, from left, Peterborough district environmental officer Bruce Hancock and Deputy Minister Everett Biggs. (See Weeds — page 3.)

Inside LEGACY

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Chief Librarian
University of Toronto
Toronto, Ontario

Robert L. Biggs

Third Grade
Class Class
No 9163
Toronto

Canada Post

BRIEFLY

Quebec hosts first conference

Quebec has offered to host the first Canadian Symposium on Water Pollution Research to be held outside the Toronto-Hamilton area. The symposium will take place December 3, 1976 at Concordia University on Montreal's St. George Williams campus.

A call for papers went out August 1, with September 25 the deadline for abstracts. This is not the traditional symposium, but an extension of it. Ontario has offered full support to the Quebec forum which will try to investigate all fields of water pollution in Canada. Additional conferences in other parts of the country are being considered and supported by the symposium executive.

Symposium proceedings will be published in a refereed publication.

Dean named for Environmental studies

Dr. Rodger D. Schwass has been appointed dean-elect of York University's faculty of Environmental Studies effective September 1, 1976.

Dr. Schwass, who succeeds Dr. G. A. P. Carrothers, is presently vice-president of Acres Consulting Services and managing director of HMA Ltd./Acres (Toronto, Calgary and Vancouver). He is a Canadian member of UNESCO's Special Committee on Communications Policy and senior advisor, Food Industry and Regional Studies.

Environmental issues are among Dr. Schwass' continuing interests and he has made media presentations and approached many questions of an environmental nature during his career.

He is married and has four children.

Canada participates in coming conference

Canada will present 10 papers on water pollution research and water quality protection at the Eighth International Conference on Water Pollution Research in Sydney, Australia, October 17-22, 1976.

This conference will be a forum on all facets of water pollution and its abatement, as well as the engineering design, construction, operation, control and management of wastewater collection systems. A total of 72 papers will be presented and technical inspection tours will illustrate the program.

According to the organizing committee, worldwide interest has been shown and attendance should approach 1,000 delegates and others. A social program for the families of delegates is planned to include sight-seeing tours, receptions and other social events.

Canada doubles patrols

Environment Canada's fisheries and marine service will be doubling patrol of offshore waters when Canada's fishing zone is extended 200 miles by January 1, 1977.

Air and sea surveillance and enforcement are gradually being increased now, with patrol days roughly doubled on both the Atlantic and Pacific coasts. Aircraft hours for locating and identifying fishing vessels will also double.

The Department of National Defence and the Ministry of Transport will provide substantial support to the Fisheries and Marine Service patrol program. An additional 205 foot vessel carrying a helicopter and two 105 foot high-speed aluminum vessels will be in service on the Atlantic coast early next year.

Committee formed for hazardous chemical study

The technology development and appraisal section of the air-resources branch, authorized by the Management Board of Cabinet, has established a Hazardous Substances Committee (HASC) to deal with the problems and prevention of injury to people who come in contact with various hazardous chemical substances.

This committee will strive to identify and assess potentially hazardous airborne material, evaluate control technology, sampling and analytical techniques, recommend action on particular problems, advise environmental standards setting committees and expedite the dissemination of information.

The committee is composed of representatives from the following Environment Ontario branches: air resources, laboratory services, pollution control, water resources regional operations as well as representation from the Ontario Health Ministry. And will continue the program of investigation begun in the fall of 1974 which has resulted in reports on asbestos, vinyl chloride monomer and PCBs.

This program will synthesize and co-ordinate efforts to determine the priorities of other branches of the Ministry and regional offices in dealing with hazardous materials.

Wintario could fund cleanup

Environment Ontario Minister George Kerr has announced that funds from Wintario may be used for environmental health programs including the cleanup of old abandoned mines that are sources of pollution.

He is planning to meet with representatives of northern Ontario locals of the United Steelworkers of America to discuss these pollution problems.

Runoff from abandoned mines and tailing heaps in the Elliot Lake area is polluting the river systems that flow into Lake Huron and one waterway tested showed five times the acceptable level of radium.

Resourceful manager required for recovery plant

The Ontario Ministry of the Environment has launched a talent hunt for a qualified company to manage and operate the most advanced waste processing plant in the world, now under construction in Downsview.

The plant is a unique combination of a working resource recovery facility, capable of serving more than 300,000 people, and a sophisticated Ministry research and development centre. This presents an unusual challenge to the operator and an opportunity to demonstrate what can be achieved by the joint effort of industry and government.

As a preliminary to tendering, the Ministry has invited interested companies to submit qualifications and detailed information on their backgrounds, capabilities and financial status. Pre-qualified groups will be invited to tender on the plant management contract, which includes operation and maintenance of the plant, preparation and market delivery of processed materials and the transportation of transferred waste and process residue to disposal facilities.

The experimental plant, when it opens later this year, can accept up to 800 tons per day of Metropolitan Toronto garbage.

As much as 600 tons per day of waste can be transferred at the plant or up to 600 daily tons can be processed on a two-shift basis for recovery of material and energy resources.

The experimental plant will accept household refuse and commercial and industrial solid waste, including oversize, bulky wastes such as refrigerators, and other appliances and produce baled paper and cardboard, ferrous metal, non-ferrous metal, glass, paper fiber, organic fiber, compost and fuel.

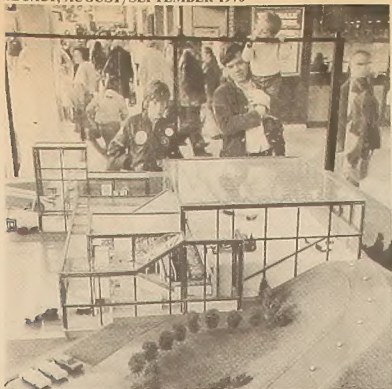
The working quantities of recovered waste products will be used to generate and develop markets for resource recovery. Some of the recovered material will be fed to provincial and industrial experimental installations to develop new uses for reclaimed waste. All plant processes will be heavily instrumented and monitored to establish cost and operating efficiency data on all these processes.

The plant's operation and research activities will receive the general supervision of a committee representing the Ontario Ministry of the Environment and Metropolitan Toronto.



Working while others play...

Ministry staff conduct nearshore water surveillance in Toronto harbor aboard the Monitor II, one of five water quality testing vessels. The vessels spearhead joint Canada-U.S. efforts to improve Great Lakes water quality under the auspices of the International Joint Commission. They operate in the nearshore zone monitoring the resultant effects of both point sources and tributary sources of discharge originating from municipal, industrial or land-runoff locations.



This model resource recovery plant is similar to those being proposed by Environment Ontario for use throughout the province. These plants could be sources of substantial energy savings.

Reports discuss energy potential of solid waste

Two reports were recently released by Environment Ontario's Centre for Resource Recovery, one dealing with the uses of solid waste for industrial fuel and the other giving an energy analysis of resource recovery methods.

These reports were prepared jointly for the Ministries of Environment and Energy as part of Ontario's energy management program.

With the prices of prime petroleum fuels, natural gas and fuel oil escalating and domestic petroleum reserves diminishing, the environmental advantages of using solid waste for industrial fuel have been established. Solid Waste for Industrial Fuel by Envirocon Ltd. (\$2.00) discusses these advantages with a focus on several methods of conversion, including a detailed description of five pyrolysis/gasification systems.

The Ontario Research Foundation's Energy Analysis of Resource Recovery Options (\$3.00) established

the potential energy savings in recovering material from municipal garbage and assesses the costs of several recovery methods.

Commitment improves lakes quality

Under agreement with federal authorities in Canada and the U.S., Ontario has made and met a substantial commitment to improving Great Lakes water quality.

A key part of meeting these obligations was the provision, from 1971 to 1975, of \$400 million for sewage treatment and trunk sewer projects. Of this total, \$11 million was spent on phosphorus removal facilities in 160 municipalities.

Ontario announced a detailed program of phosphorus removal in 1970. As early as the mid 1960s, Ontario was researching phosphorus removal methods and working out the best methods of implementation.

Phosphorus removal equipment is now installed in every sewage treatment plant in southern Ontario which discharges more than a million gallons a day of effluent into the Great Lakes.

This affects 72 per cent of the total treated sewage flow in the province. Environment Ontario staff predict that this program and the new wave of sewage facility construction in the U.S. will produce results over the next few years in terms of improved Great Lakes water quality.

Ontario launches intensive PCB study

An intensive investigation into the effects of PCBs in the environment has been announced by the Ontario Government and will involve the collection and analysis of 4,000 fish samples and 4,000 water, sediment and air samples.

This study has been undertaken jointly by the

Ontario Ministries of Health, Natural Resources and the Environment and will provide comprehensive and consistent data on PCB levels in Ontario fish for the assessment of changes in PCB pollution in the future.

Based on previous studies, the Ministry of Health has advised that eating certain species of fish from the Great Lakes could be a possible health hazard.

A revised federal guideline has reduced the part per million (ppm) of PCB from five to two, for safe consumption.

The Ministry of the Environment and Environment Canada are co-operating in the control and identification of PCB discharge in the air, such as municipal incinerators and electrical manufacturing plants.

Weeds

(Cont'd from page 1)

Ontario Environment Minister George Kerr and Deputy Minister Everett Biggs led the local press on a tour of the weed harvesting operations on Chemung and Buckhorn Lakes, north of Peterborough, on August 20.

Mr. Kerr and Mr. Biggs visited sites of this year's weed cutting, rode one of the harvesters and toured the farm research project.

Cutting aquatic weeds, as a method of lake management, has been conducted on an experimental basis since 1973 at the southern end of Chemung Lake. This year's expanded program will see the harvesting of more than 1,150 acres in the two lakes.

On the experimental farm, geese and cattle are being fed on harvested weeds in the form of silage in an attempt to find a suitable use for the overabundant weeds.

Insecticide Mirex found in Lake Ontario

Traces of Mirex, an insecticide not registered for use in Canada or the northern United States, have been found in Lake Ontario fish.

Because U.S. medical researchers have identified Mirex as a possible carcinogen since it has induced tumors in two strains of mice, the Ontario Government has advised against eating more than an occasional meal of any fish from Lake Ontario that contains excessive mirex levels.

The source of this potentially dangerous insecticide is a mystery, since its use isn't registered in Canada, any Great Lakes states in the U.S. or near any waterways leading to the lake.

Airborne contamination has also been ruled out. The Environment Ontario pesticide laboratory has analysed approximately 1,000 fish from various locations in the Great Lakes but only fish from Lake Ontario were found to contain Mirex residues exceeding the U.S. federal guidelines of 0.1 ppm. Possible sources of industrial discharges are being investigated.

Mirex, like PCBs, is a chlorinated hydrocarbon, a family of toxic long-lasting chemicals that also includes the pesticide DDT.

Monitoring and study of the contaminant is being continued by the Ontario Ministries of Health, Natural Resources and the Environment.



Air Resources personnel make adjustments to the new mobile air monitoring unit, stationed at Long Point Provincial Park, for its inaugural air quality study.

Mobile 11 air van hits the road

Algoma charged

Algoma Steel Corp. Ltd. of Sault Ste. Marie appeared in court August 10 to answer 14 charges of violating water standards.

Of the charges laid June 21, two were under the Environmental Protection Act and 12 under the Ontario Water Resources Act.

Trial has been set for Nov. 10.

Algoma had been named before the International Joint Commission as a source of phenol and the only specific violator in the past year of U.S.-Canadian guidelines against trans-boundary water pollution.

its complicated collection of scientific gadgetry.

"To calibrate and check out the sophisticated equipment it was necessary to find an area relatively pollution free and at the same time close enough to Toronto in case of equipment failure," said Dr. Singer. "Long Point Provincial Park is an excellent location for both those reasons."

This gadgetry includes two six-kilowatt generators, air conditioning, a computer and a 33-foot mast, called a telescopic meteorological tower which can be automatically raised and lowered to measure wind speed, direction, tempera-

ture, barometric pressure and humidity.

The instrumentation is capable of monitoring more than 10 chemical pollutants including ozone and hydrogen sulphide. The van is also equipped to measure solar radiation which may affect the rate at which certain chemical pollutants react in the atmosphere.

Mobile II is the third and largest in the air resources branch fleet of testing units. It is 23 feet long and will, like its predecessor, be put out on the road to collect and analyse air samples from across the province, to detect sources of airborne contamination.

84-acre Lorne Park plant to be completed by 1978

Water treatment goes underground

By ROGER DAVIES

New residents in the Lorne Park area on Lake Ontario may be dismayed to see vast construction activities near their homes — right in the middle of an 84-acre park.

But they need not worry.

Indeed, they may be elated by the scheme that in two years will return the park to its natural setting. And, what will be a 50 million gallon a day filtration plant, a large reservoir and pumping station will have virtually disappeared from view.

All of it literally will be buried beneath a terraced landscape.

The idea evolved when the Ontario Ministry of Environment (which is building and will operate the plant) and its consultants Gore and Storrie of Toronto studied the needs of the neighborhood.

The land, purchased in the late 60s specifically as a site for a new water works, was leased to the City of Mississauga, and made into a "passive" park. Picnic areas were established, although most of the land was used for unorganized recreational activities. And it has turned into a popular lakefront spot all the year round.

Today residential subdivisions either side of the park fully appreciate it as a valuable recreational amenity, as do the many visitors.

So it was clear to the Ministry and the consultants that any steps to change the park drastically would not be in the community interests. To begin constructing a standard building certainly would have ruined the view for some people. "We didn't want the plant to detract from the park's current uses in any way," said Gore and Storrie's project director Bob Goodings.

There also was the question of security. Vandalism is the bane of most municipal works operations. And almost every public facility has to have some type of protection.

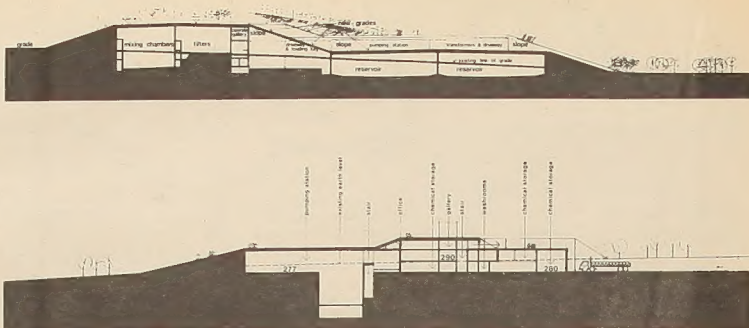
Usually the solution is to surround it with fences topped with barbed wire. Unfortunately this does not always put kids off the idea of trying to scale the fence. Consequently it ends up as a public hazard. And it doesn't always keep intruders out either. Moreover barbed wire is not exactly aesthetic, making it entirely unsuitable for a park.

"In this case we accepted the fact that kids like to walk on roofs, and clamber over barbed wire, etc.," said Mr. Goodings. "So why not cut out the barbed wire and make it safe for them to do these things? We couldn't have done this by erecting a building. Burying the plant was a good solution for everyone." Which was readily agreed to by Ministry engineers Art Thomas and George Mierzynski.

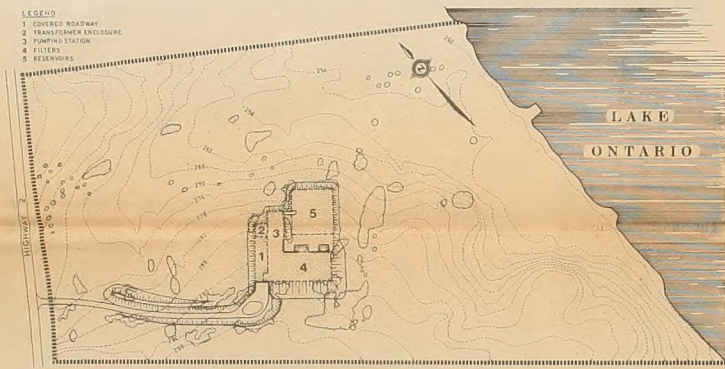
The original idea for this came from an architect, Stephen Irwin, who was retained to help the consultants "hide" the plant.

With this concept given the go-ahead, engineers prepared detailed plans and a model of the covered plant for presentation to local community associations and the regional council.

The concept was well received



Profile of Lorne Park shows, top, section through plant looking northwest; bottom, section through plant looking southwest.



The site plan of Lorne Park water purification plant shows proximity to Lake Ontario.

and before too long the finishing touches were being done to the design of one of Canada's first filtration plants to be built below ground level.

Such an approach did require some changes from a conventional water treatment plant. For example, liquid chlorine (sodium hypochlorite) will be used as the disinfection agent instead of gaseous chlorine, which would usually be used in this size of plant. But its extensive safety requirements made it unsuitable for this site.

Another difference from most filtration plants was that landscape architects were engaged to ensure the works will blend in with the natural setting.

This is particularly challenging since, the majority of the facility will go below the surface of the park — down 66 feet to the raw water intake pipe — 40 feet will rise above the existing ground level. But it too will be covered.

An earthen mound, some two to four feet thick, will cacon the above surface structures, including the five million gallon reservoir. The result will be three terraces, dropping down towards the lake, that will be landscaped with 200

trees and shrubs, and flower beds. All of which should help disguise the handful of signs that man's works lies underneath the park.

These are few. Four sets of windows will allow daylight into the building, (which is not a priority since the plant will eventually be remotely operated from Lakeview filtration plant five miles away). There are several emergency exits, as well as skydomes for light and ventilation to mark the service entrance at the plant. A service road from Highway 2 through the property will be partially hidden by earthen beams to be built 700 feet either side along part of its length.

Traffic along here will be light. Twice a month a truck will deliver chemicals. Also only a handful of personnel are required at the plant. In time: only daytime service personnel.

Putting the facility below ground level will cost an estimated \$1 million more than leaving it exposed, one twentieth of the nearly \$20 million cost.

Part of the total cost includes a 5000 ft. intake pipe and relatively sophisticated control devices inside the plant.

In line with the Ministry's policy

of having all backwash wastes at new water works plants treated, holding tanks are included in the design. Sludge is to be discharged gradually to the sanitary sewers for treatment at a nearby pollution control plant.

The overall concept of burying the facility has already achieved recognition. It won an architectural award for what the judges saluted as "non-building architecture." It has the sense, the judges said, to get out of the way — and permit a view of the lake producing a place for people to enjoy.

Construction started earlier this year on the project and by 1978 residents of Mississauga should have the whole of their park back. Indeed it's foreseen that not only will children be able to walk over the plant, another first for Canada, they will also be able to ski or toboggan down the slopes in winter.

And as a bonus, they'll even be able to have a closeup view through the windows at some of the plant's operation.

But they're not encouraged to go too close. Closed-circuit TV, an innovation for a waterworks plant, will be watching all at the main service entrance — just in case.

CONFERENCES

5000 to confer on air pollution

An anticipated 5,000 international authorities on air pollution control will attend the Air Pollution Control Association's 70th annual conference in Toronto June 19-23, 1977.

Headquarters site for the meetings and exhibits will be the Sheraton Centre Hotel, opposite Toronto City Hall, with the president's luncheon and the evening banquet scheduled to take place at the Royal York Hotel.

General conference chairman will be W. B. (Brad) Drowley, executive director, resource development, Environment Ontario, assisted by vice-chairman Richard A. Walli of Joy Manufacturing Company, Toronto. Mr. Drowley, a founder of the Ontario Section APCA, was the second Canadian to be elected president of the international body in 1971-72.

Members of the worldwide technical and educational forum, with headquarters in Pittsburgh, Pa.,

represent all sectors of industry, science, medicine and government. Founded in 1907 in dedication to the science of air pollution control, the organization last chose Toronto for its convention site in 1965.

During the four-day conference more than 150 technical papers and panels will examine every facet of air pollution abatement. In addition, about 200 manufacturers of air pollution control equipment from the U.S., Canada and abroad will demonstrate their latest technical innovations and equipment in the major exhibit halls of the Sheraton Centre.

Other chairmen of the 1977 Toronto conference committee are G. M. Break, Toronto Transit Commission, "Tours and Transportation"; D. J. Ogner, Central Region, Environment Ontario, "Local Host and Information"; R. W. Slater, Environment Canada, "Housing"; A. A. Schult, Steel

Company of Canada, "Printing"; E. W. Anderson, Mississauga, "Protocol and Courtesies"; Carol D. Burnham, S. N. C. Consultants, "Registration"; E. Koczur, Willowdale, "Finance"; Richard A. Walli, "Food Functions and Entertainment"; Robert Miller, St.

Mary's Cement Company, "Facilities"; R. J. Frewin, Environment Ontario, "Public Relations and Publicity"; T. R. Ingraham, Environment Canada, "Technical Program"; and co-chairmen Mrs. W. B. Drowley and Mrs. Richard A. Walli, "Ladies' Program".

Technical papers aired in Oregon

The Air Pollution Control Association (APCA) recently concluded its 69th annual meeting in Portland, Oregon, on July 1, electing David Stanley, commissioner, Environmental Quality Engineering, State of Massachusetts, as 1976-77 president.

APCA in co-operation with its Ontario Section and Environment Ontario set up a booth among exhibitors at the Portland Coliseum to promote the Toronto '77 conference and Ontario's attractions. The booth was staffed by Josephine

Smith, Metro Toronto Convention Bureau; Anson Raymond, Information Services Branch, Environment Ontario, and members of the Toronto Conference Committee.

Abstracts of the many technical papers presented are available in booklet form from the organization's head office in Pittsburgh, Pa., at 4400 Fifth Avenue. Highlights of the recent Portland conference will be published in the forthcoming issue of the APCA monthly journal, also printed in Pittsburgh.

Industrial Waste Conference

Meeting focuses on assessment

By GEOFF LEE
Ryerson Polytechnical
Institute

The subject of environmental assessment dominated the opening speeches of the 23rd Ontario Industrial Waste Conference at Toronto's Prince Hotel.

Minister of the Environment, George Kerr, said Ontario's Environmental Assessment Act was a highly important piece of legislation in his opening address to delegates Monday, June 14. "It is designed to protect and improve the quality of the human as well as the natural environment."

Dennis Caplice, director of the Ministry's environmental approvals branch, said, "The Environmental Assessment Act is an important new decision-making tool designed to see that all potentially significant effects of proposed undertakings are identified and evaluated at a stage when alternative solutions including remedial measures and the alternatives of not proceeding, are still available."

Mr. Caplice explained the act comprehensively defines "environment" to include social, economic and cultural conditions such as buildings, machines and the effects of human activities such as odours, heat, sounds and gases.

The act's legislation will be implemented on a phased basis, applying first to Ontario government projects and programs, as

designated by the act's regulations, then to municipal projects. Eventually the act will be extended to the private sector.

More than 550 registered delegates representing industry, government, education, and science heard 21 briefs and papers on resource recovery, renewable energy, PCB control, industrial waste disposal and other environment related topics, arranged by program convener John Patterson of Environment Ontario's industrial approvals section.

Doug Stone, project engineer for Saskatchewan Wheat Pool, delivered a unique paper on technical solutions to dust control from Thunder Bay terminal grain elevators. The talk featured the technical negotiations between the company's employees and the Ministry of the Environment in finding a solution. In the 10-year 30 million dollar program, dust emission was reduced 90 per cent in seven elevators to meet air management branch standards by reducing air emissions from dust control systems at 30 grain transfer points in the elevator system. Special air vents which were installed in the grain cleaning systems collect about 5 tons of dust per day.

The scope of environmental parameters in waste control was evident when Mory, Hirt, president of Toronto based M.E.P. Company, spoke about the

effects of meteorological influences on ambient air quality. He said proven supplementary control systems provide an accurate and efficient method of judging ambient air concentrations of sulphur dioxide.

"With comprehensive air quality data gathered by monitors and weather forecasting, a plant operator can reduce emissions when meteorological factors are environmentally unfavorable," he said.

Mr. Stone listed wind direction changes at different stack heights, local topography and water bodies as factors influencing ambient air concentrations.

The conference planning committee, chaired by K. H. Sharpe, assistant deputy minister of Environment Ontario, combined the technical program with social functions which were highlighted by Tuesday's banquet speech by Joseph Forster, a Toronto radio station executive, entitled "The Humor and Heartaches of a Communicator."

A special program for the spouses of delegates included a tour of the Scarborough Civic Centre and shopping at the Scarborough Mall.

Murray Cheetham, from Environment Ontario's information services branch, who acted as conference coordinator, said it was the most successful conference ever. Tentative dates for the 1977 conference have been set for late May.



Getting a bird's-eye view of the clear waters of Lake Couchiching is this airborne skier.

One family's attack on waste

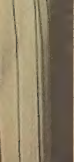
The children enjoyed outings to the recycling depot helping carry the 49 pounds of non-returnable products from the car to the bins. The Ratcliffs found that one trip a month to the depot was sufficient to dispose of any build-up of glass.



Why pay for flashy wasteful packaging that will soon end up in the garbage? Joan Ratcliff and daughter Ann find that buying products in refillable or returnable containers can save money as well as reduce their garbage output.



e David and
rogram got



n Ratchford
ers can save



Newspapers are the bulkiest single component in home garbage. They can be buried or, if separated from the rest of the household garbage, they can be reused in the manufacture of such things as building materials. Ann puts a bundle of papers out on the curb for Scarborough's bi-weekly paper pick-up.

Joan discovered that subconsciously she had already begun buying many returnable or refillable products — such as milk in plastic jugs and refills for paper products — so that her buying practices weren't significantly affected.

Between May 1 and June 30, the Ratchfords were pleased to learn that without much difficulty they had successfully diverted 209 pounds (one-third of their refuse) from Scarborough's sanitary landfill into the recycling stream.

And along with the Ratchfords, LEGACY was also encouraged because the point of the experiment was to see what a typical family unaccustomed to waste management methods could achieve.

So the story of the Ratchford family is the record of a success.

What can one family do?

A lot.



If we can't buy the items we need in returnable containers, we can at least separate the glass bottles and take them to a recycling depot. Waste glass is used to make new glass and can be used in paving materials, building brick, insulating materials and aerated concrete. Joan Ratchford and her children are careful to sort the glass by color.



Composting is the breaking down of food and garden wastes into a soil conditioner. It is also the easiest way to get rid of this waste material. Jack Ratchford shows Paul and David the fertilizer, which they have produced through their compost pit.

Recovery plant proposed for Halton Region

An area waste management study, presented recently to Halton Region, recommends that a resource recovery plant be constructed to reclaim material from the municipality's garbage, when firm markets for recovered materials and fuel fractions have been established.

The report is part of an Ontario Ministry of the Environment program to improve waste management systems throughout the province. Under this program, Environment Ontario offered to provide the full capital cost of constructing a resource recovery plant on municipal land, recovering 50 per cent of this cost over a 40 year period.

Halton was one of the major centres selected for

priority action in the program.

A report, prepared by M. M. Dillon Ltd. for the Ministry and tabled before regional council, endorsed the feasibility of a central waste reclamation plant. As a first step, the report recommends the construction of a major solid waste transfer station, with provision for expansion into a resource recovery plant as markets for reclaimed products develop. While the transfer station would not be eligible for the special financial assistance, any resource recovery additions would fall under the terms of the Ministry's offer.

The estimated cost for immediate construction of a complete basic resource recovery plant which in-

cludes shredding and the recovery of ferrous metals, is approximately \$10 million excluding the cost of land. An additional capital expenditure of approximately \$2.5 million dollars would be necessary for the plant to produce a refuse-derived fuel (RDF).

Further processes could be added at a later date when the technology and specific markets for additional products from waste have been fully developed.

The report shows that a regional system of waste disposal at a central landfill site with a major transfer station at the Oakville-Burlington boundary would cost \$14.53 per ton of waste. No provin-

cial subsidy is available for this system.

With a government subsidy, of which 50 per cent is repaid, a front-end plant recovering only ferrous metals would cost \$15.52 per ton of waste. When markets for refuse-derived fuel have been established, the plant could be modified and the revenue from the RDF would reduce the cost to an estimated \$5.16 per ton.

The residue from a plant producing RDF would be about 30 per cent of the total waste received. Although this residue would be disposed at a landfill site, this resource recovery system would drastically reduce the land required.

Water meet set for '76

A specialized conference on advanced treatment and reclamation of waste water has been announced by the International Association on Water Pollution Research. It will be held 13-17 June, 1977 in Johannesburg, Republic of South Africa.

Scientific papers presented at the conference will deal with fundamental studies relating to advanced water treatment technology, quality, socio-economic and environmental aspects of advanced treatment and reclamation.

Environment shows arty side

A graphic arts display entitled "These Prints May Disturb You" achieved its aim, earlier this summer. Depicting people suffering from diseases caused by environmental pollution, artist Pat Parkinson intended her work to disturb the onlooker and to provoke an acute awareness of what can result from pollution.

"Environmental problems are serious", she said, "I want to bring that home to the people that see my work. It's aimed at a personal level and is not a subtle message. I am trying for a blatant and immediate response."

Dan Shatil, of the environmental approvals branch of the Ministry of the Environment, and his wife Shulamit were deeply impressed. "It was shocking," says Shatil, "because your normal expectations of art, of an emotional response to an artistic bit of scenery, are not fulfilled. Instead you are suddenly assaulted by

a very schematic, rough approach to a rough subject."

Shatil admits that some people were depressed by the show's message which is blatantly simple. "If we don't look after our own environment, we'll die from pollution." His wife found the graphics very provocative. "They ran against my stream of thinking, and the presentation was unusual, against the norm. The elements of red and black in the show induced fear but I realized that something has to be done," she said.

Miss Parkinson, who has had showings in England, the U.S. and previous exhibits in Toronto is extremely involved with her subject, and how environmental health problems affect laborers forced to handle dangerous materials.

"These Prints May Disturb You" ran at the First Unitarian Church on St. Clair Avenue West from May 20 to June 18.



Pat Parkinson, left, discusses her prints with Environment Ontario planner, Dan Shatil, and his wife Shulamit at a recent graphics exhibit.

1976-77 Training courses announced

Basic Sewage Treatment Operation. This course is designed primarily for operators-in-training and to increase the efficiency of wastewater treatment plant operators. For operators only. Dates: January 17-21. Capacity: 40. *Applications must be submitted before November 15.*

Basic Water Treatment Operation. This course is designed primarily for operators-in-training and to increase the efficiency of water treatment plant operators. For operators only. Dates: January 31 - February 4. Capacity: 40. *Applications must be received prior to November 15.*

Activated Sludge Workshop. This workshop will increase the efficiency of activated sludge treatment operators at all levels of responsibility. By emphasizing methods of process control, it is specifically directed at an operator employed as, or likely to be promoted to shift foreman, operator-in-charge or chief operator of an activated sludge plant. For operators only. Dates: December 13-17. Capacity: 25. *Applications must be received by October 15.*

Basic Gas Chlorination. This workshop will familiarize the new or inexperienced operator with the operation of various types of chlorination equipment, as well as demonstrate methods of troubleshooting defective units. For operators only. Dates: December 7-10 (Windsor) and January 18-21 (Toronto). Capacity: 25. *Applications must be received by October 15 (Windsor) and November 15 (Toronto).*

Industrial Abatement - Air Management, Part III. Divided into three sections, this course will familiarize new personnel with the air management aspect of industrial abatement, and increase the efficiency of provincial officers involved in these duties. For Ministry of the Environment staff only. Dates: January 10-14. Capacity: 30. *Applications must be received prior to November 15.*

Acoustics 3. These courses are divided into four parts and

are designed to familiarize personnel with the techniques of practical acoustics, required to fulfill the obligations of the municipal noise control officer or of other noise control and abatement agencies. Upon successful completion of the appropriate parts of the course, the trainee will be qualified to perform noise control duties at the level indicated by the certificate awarded. Dates: January 24-28. Capacity: 40. *Applications must be received by November 15.*

Sewer and Watermain Construction Inspectors Course No. 1. This course, developed and conducted jointly with the Ontario Municipal Engineers Association, is intended to broaden the understanding and knowledge of inspectors engaged in supervising the construction of sewers and watermains. Dates: December 6-10. Capacity: 40. *Applications must be received by October 15.*

Primary Treatment and Digestion. This workshop is designed to increase the knowledge of primary wastewater treatment plant operators. It is specifically directed at an operator employed as, or likely to be promoted to, shift foreman, operator-in-charge or chief operator of a primary treatment plant. Operators only. Dates: December 13-17. Capacity: 25. *Applications must be received by October 15.*

Surface Water Treatment. This workshop is designed to increase the knowledge of experienced water treatment plant operators. It is specifically directed at an operator employed as, or likely to be promoted to, shift foreman, operator-in-charge or chief operator of a water treatment plant. For operators only. Dates: November 29 - December 3. Capacity: 25. *Applications must be received prior to October 15.*

All of the above courses will be conducted in Toronto unless otherwise marked. For further information, please contact the Registration Secretary, Training and Certification Section, Personnel Services Branch, 135 St. Clair Avenue, W., Toronto, Ontario, M4V 1P5. Telephone (416) 965-6994.

Old cars are assets

Project Remove is an experimental program established last year by the Ministry of the Environment to remove derelict vehicles and recycle usable metals in 20 northern Ontario municipalities. It was so successful that 17 contracts were renewed and 11 new contracts signed this year.

For every eight cars on the road, one is abandoned. This represents 400,000 derelict vehicles, each with about one ton of valuable recyclable metal. Last year's program resulted in the reclamation of 5,858 cars at a cost ranging from \$11 to \$50 per car depending on the municipality.

Abandoned cars, which no one wants, have been a serious problem for a long time. They mar the natural environment and they depreciate, rusting and decaying for years. Relative to the depletion of metal resources, these rusting hulks represent a terrible waste.

This is the first in a series of educational articles for teachers, students and environmentally concerned individuals by Environment Ontario Educational Resources Co-ordinator Jane Thomas.

Pesticides - to spray or not to spray- that is the question

LEARNING

Basically, a pesticide is a substance that kills or controls some unwanted organism. The legal definition of a pesticide under Ontario's Pesticides Act and Regulations is: "... any organism, substance, or thing that is manufactured, represented, sold or used as a means of directly or indirectly controlling, preventing, destroying, mitigating, attracting or repelling any pest or of altering the growth, development, or characteristics of any plant life that is not a pest."

Types of Pesticides

Until 1939, only a few inorganic chemicals and natural plant products such as derris and pyrethrum were available for pest control. However, in 1939, the ability of the chemical compound DDT to control disease-carrying insects was discovered.

Within the next decade, many other chlorinated hydrocarbon compounds such as benzene hexachloride, heptachlor, aldrin, and dieldrin were developed.

Although these insecticides were efficient, it was discovered that they also remained active in the environment for long periods.

Within the last 15 years, new pesticides in the organophosphorus and carbamate groups have been developed. These pesticides have a relatively shorter life span in the environment because they break down, by various means, into simpler non-offensive substances.

An ideal pesticide is one which is highly effective against the target pest but, at the same time, safe to all other life forms. It should break down, within a reasonable period of time, to harmless products. It should also be easy to apply, harmless to equipment and property and economical to use.

Government Supervision

For a pesticide to become available for use in Canada, it must be

tested extensively and must satisfy the control products section of Agriculture Canada as to its safety and efficacy in use. It must also comply fully with the Federal Pest Control Products Act, the Federal Food and Drug Act, and the Canadian Environmental Protection Act. In Ontario, the safe use and management of pesticides is outlined under the Pesticides Act and Regulations which are enforced by the pesticides control section of the Ministry of the Environment. The Ministry licenses and supervises all vendors and commercial applicators of pesticides. The Ministry also advises the home owner and licensed applicator on the proper use of pesticides.

In addition, classification of pesticides is made by the Ontario Pesticide Advisory Committee. This committee is composed of experts from the agricultural and chemical industries, universities, and a number of government agencies. These classifications, when adopted, become amendments to existing legislation. An important example is the restriction of the use of persistent chlorinated hydrocarbon insecticides such as DDT, aldrin, dieldrin, and heptachlor, which has been in effect in Ontario since January, 1970. In 1971, endrin was removed from agricultural use as well.

Pesticides residue in soil, drinking water, food, and animal feed are continuously being monitored by the Ontario Ministry of the Environment, the Ontario Ministry of Agriculture and Food, the Food and Drug Directorate (Health and Welfare Canada), Environment Canada, and other provincial and federal government agencies.

Pesticide Residues

The term pesticide residue refers to quantities of pesticide which may remain after the application of a chemical has been completed and the pest controlled.

If you consider a food chain, it is possible to see how a persistent pesticide could accumulate to a hazardous level, even though it is safely used. When a forest or field is sprayed with an insecticide to preserve valuable trees or crops, this insecticide is picked up by numerous non-target insects. A frog, for example, may eat hundreds of these insects within a few days and may concentrate some of the pesticide within the tissues of its body. If a snake eats a couple of dozen contaminated frogs, it could concentrate the initial insecticide dose several thousand times. If a hawk then consumes a number of snakes, it may concentrate enough of the pesticide to biologically affect the hawk by lowering its reproductive potential. This has been the major

reason for restriction of chlorinated hydrocarbon compounds in the past five years.

The prevention of residue problems is one of the main reasons that pesticides are so thoroughly tested before licenses for their manufacture and sale are granted. This is also why pesticide users are issued strict recommendations as to how a pesticide must be used and in what dosage. In the case of existing residues, monitoring is continuously carried out by a number of government bodies.

Pesticide Residues

Pesticides enter the environment in one of two ways: either directly, through pesticide application; or indirectly, through a number of actions, many of them stemming from unwise handling of the pesticides.

Direct application of pesticides is carried out to affect pest control in animals, crops, soils, buildings and water. Indirect addition of pesticides to the environment may occur through improper disposal of pesticides or cleaning of spray tanks, dumping of pesticides into sewage systems and dumping of food products containing high residue levels.

Another source of indirect pesticide entry is drift. Pesticides in the air may return to earth in rain or snow, at some distant point where the substance may never have been used. This is the reason for pesticide residues in snow and in non-migratory animals of the Arctic and Antarctic regions. Pesticides may also be added to the air through the escape of fine droplets of chemical during ground or aerial spraying; evaporation of residues; the blowing of wind-eroded soil particles containing pesticides; smoke from manufacturing processes; and a number of other minor causes.

Pesticide Benefits

Pesticides not only help to increase the yield of food crops but also serve to maintain a higher quality of food which the consumer expects. Both of these advantages aid in keeping the cost of food lower than if pesticides were not employed.

It is obvious that many areas of public health have been improved through chemical control of disease-carrying pests. Incidence of diseases such as equine encephalomyelitis, malaria, typhus, yellow fever, and many others have decreased because of the control of biting insects.

For conservation purposes, control of pests in parks and forests ensures healthy trees and plants. Entire forests have been saved by pes-

Questions for the Reader

1. By contacting your local municipality or agricultural representative, find out if any spraying has been done in your area lately. What type of pesticide was used and what pest was the applicator trying to control? Is that area sprayed often? With the same chemical?
2. Are there any substances about your home used as pesticides? What is the brand name? What are the instructions for using it? Where is it kept? What pest was it designed to control? How many brands of pesticides are available through your local hardware store? Shopping centre?
3. Explain the term "the biological control of insects" and give some examples of how this can be done.
4. Name some advantages of using pesticides.
5. Name some disadvantages of using pesticides.
6. Write a brief report on the life cycle of one of the beneficial insects. State why this particular insect is considered beneficial.

ticides from destruction by gypsy moths and spruce budworms. For management of water systems, pesticides are used to control algae, weeds, parasite-carrying snails, leeches, lampreys, and populations of undesirable fish. In this way, higher populations of desirable fish are maintained by controlling some of their pests and diseases. More attractive and functional recreational waters are maintained through management of water weeds, algae and other pests.

The best method of controlling pests is an integrated one wherein several of the methods of pest control are employed. However, if world health and food production are to be maintained and improved, pesticides are an essential asset.

Suggested Reading

1. **Pesticides and the Living Landscape** by R. L. Rudd, Faber and Faber, London, 1965.
2. **Pesticides and Pollution** by K. Mellanby, Collins, 1967.
3. **Beneficial Insects** by L. A. Swan, Harper and Row, 1964.
4. **Pesticides: Their Implications for Agriculture** by Agriculture Canada, Ottawa, 1973.
5. **"Beware Encephalitis"** Civic, The Public Works Magazine, April 1976, p.p. 8.
6. **Environment and Good Sense** by M. J. Dunbar, McGill-Queen's University Press, 1971.
7. **Pesticides and Wildlife Information Service**, Canadian Wildlife Service, Environment Canada, Ottawa, 1973.



International Joint Commission holds first open session

U.S. and Canada review

The U.S. and Canada are committed to minimizing pollution effects along their common frontier. The mechanism of that commitment is the International Joint Commission. In July that body gathered in Windsor to hear reports of its United States-Canada Great Lakes Water Quality Agreement institutions.

On hand for some of the proceedings were Russel Train, Administrator, United States Environmental Protection Agency, President of the Privy Council, Mitchell Sharp and Ontario Environment Minister George Kerr.

With the Detroit skyline in the background they are pictured on the cover of this month's **LEGACY** as they get a first-hand look at some of the near-shore surveillance equipment aboard Guardian No. 1, Environment Ontario's 54-foot survey vessel. Conducting the tour is a member of the Ministry staff, John Sweet, far right.

In its first-ever open meeting July 19-22, the IJC heard reports from the four major institutions reporting to it including the principal advisor to the commission, the Great Lakes Water Quality Board.

The board presented its fourth annual report to the commission including detailed information on the progress of municipal and industrial programs and an overview of current efforts to control nonpoint pollution sources. The board presented revised water quality objectives and details of

the proposed International Great Lakes Water Surveillance Program to improve the effectiveness of the agreement.

In its report special attention was given to radioactivity, toxic substances including PCBs, DDT and Mirex and an evaluation of phosphorus control programs.

The International Reference Group on Upper Lakes Pollution presented the final report of its three-year study on Lake Superior and Lake Huron-Georgian Bay, including sources of pollution and recommended remedial action.

The International Reference Group on Pollution from Land Use Activities gave a progress report on its ongoing activities, expected to be completed in 1978. It reported that a lake-by-lake inventory of trends in land use practices to the year 2020 has been completed for the U.S. side of the Great Lakes Basin. It also presented data on pesticides monitoring in agricultural basins and in lake and river sediment.

The Great Lakes Research Advisory Board reported on its review of research activities in the U.S. and Canada to assist government control agencies in reassessing their programs.

The following is a more detailed summary of these four major presentations, preparatory to the IJC's annual report on the progress of the international cleanup of the Great Lakes.

THE REFERENCE GROUP ON UPPER LAKES POLLUTION

Despite the impact of modern technology in industrialized cities, the quality of water in Lakes Superior and Huron is still excellent, a report of the International Reference Group on Upper Great Lakes Pollution stated.

After a three year study, the reference group of the International Joint Commission described these waters as the type that Canada would like to have in the more polluted lower Great Lakes, Lake Erie and Lake Ontario.

The only instances of transboundary pollution are in the St. Marys River, according to the group. Discharges of phenolic substances by Algoma Steel Corporation and the City of Sault Ste. Marie violated the Great Lakes Water Quality Agreement.

Though the quality is excellent, said Dr. G. K. Rodgers, Canadian head of the Upper Lakes Reference Group, massive efforts are needed to maintain it.

Dr. Rodgers and other Canadian and U.S. scientists recommended a \$1.25 billion program be launched immediately to maintain water quality in the upper Great Lakes.

The group's findings, which dealt only with Lake Superior and Lake Huron-Georgian Bay, are the result of a \$14 million study paid for by the two federal governments.

According to the spending program, \$300 million would go to neutralizing pollution effects from mining wastes in Lake Superior and another \$600 million would be spent to treat algae and waste problems in the Saginaw Bay and Duluth-Superior areas.

The balance of the billion-dollar program would be directed toward smaller programs.

The group reported that Lakes Huron and Superior are affected by nutrients including phosphorus, metals, asbestos and organic materials, but many of the problems are localized near industrialized cities. Elevated concentrations of certain heavy metals and toxic organic compounds in fish are also considered lake-wide problems. The substances reach the lakes mainly through land runoff and the atmosphere, according to the members. Airborne contamination contributes 15 per cent of the phosphorus and 30-40 per cent of the lead copper to the upper lakes, the group estimates.

Contamination of the upper lakes is also caused by vessel wastes, erosion, thermal inputs, dredging and spills.

The most serious enrichment problems exist in Saginaw Bay in Lake Huron and Duluth-Superior Harbor in Lake Superior, but remedial programs are presently underway.

Goderich, Penetang Bay, Midland Bay, Collingwood Harbor, Cheboygan, Alpena and Harbor Beach on Lake Huron and Thunder Bay, Munising and Marquette on Lake Superior all show signs of enrichment. The group urged further controls for untreated wastes of Goderich and Thunder Bay, and close monitoring of municipal treatment facilities at Penetanguishene, Midland and Collingwood.

To protect public health, the reference group recommended that the Reserve Mining Company cease discharging taconite tailings into Lake Superior immediately and the Lake Superior surveillance program include monitoring the changes in asbestos concentration following the stoppage of the Reserve Mining Company discharge. The group also urged the IJC to establish a water quality objective for asbestos and that governments establish a drinking water standard for asbestos.

In an effort to prevent an increase in toxic organics, the reference group recommended a total ban on the sale, use, transportation and manufacture of PCB, aldrin, dieldrin, DDT and its derivatives. The group also suggested that before new organic compounds are produced they be fully evaluated for environmental and health impact.

To eliminate the contamination of fish and abate the existing high levels of metals in sediment the reference group proposed that there be no increase in metal inputs to the lakes. Governments were urged by the group to monitor heavy metals and take the necessary measures to prevent deteriorating conditions.

THE REFERENCE GROUP ON POLLUTION FROM LAND USE ACTIVITIES

In its second annual report to the commission, the reference group reported that a lake-by-lake inventory of land use practices to the year 1980 and 2020 has been completed for the U.S. side of the Great Lakes Basin. Another is nearing completion for the Canadian side.

Canada, Ontario pledge continued support for Great Lakes agreement

While it prepares its fourth report on the progress of the Great Lakes cleanup, the International Joint Commission heard the Canadian federal and provincial response to last year's commission report.

That report said the initial cleanup phase has led to a new thrust aimed at preventing further pollution caused by resource development and increasing use of water.

The commissioners acknowledged efforts in both countries to minimize pollution effects from land development, transportation, mining, agriculture, recreation, forestry, surface and subsurface waste disposal.

CANADA

The federal government reported that its policies applying to urban and land use planning in Ontario support that province's planning objectives.

ONTARIO

The province reaffirmed its goal

of maintaining and enhancing the quality of life in Ontario communities through anticipating future needs.

CANADA/ONTARIO

Both governments indicated that major consideration in future large-scale planning will be the results of the Pollution from Land Use Activities Reference Study expected to be complete in 1978.

Each has agreed to review the commission's recommendations to assist in the development of future large-scale planning measures.

Ontario board member William Stegall observed that the Water Quality Board will review progress in plan development and implementation in future annual reports. He added governments will undertake a comprehensive review of the agreement following release of the commission report to government expected later this year.

massive lakes cleanup

In agricultural basins, the group reported declines in observed levels of DDT. These declines, the commission was told, correlate with the period of time since DDT use was discontinued in each watershed.

The group reported that, overall, chlorinated hydrocarbon pesticides were the predominant type of pesticide observed in watersheds in both countries. PCBs in uniform and low concentrations were found in 98.5 per cent of the Canadian samples from agricultural watersheds.

The reference group told the commission that data on organochlorine pesticides and PCBs have been compiled for Lake St. Clair, the Detroit River, Lake Erie and Ontario with similar information nearing completion for Lake Huron.

The group's findings indicate a 60 per cent decrease in Lake St. Clair DDT levels from 1970 to 1974 and a 50 per cent decrease in levels of PCBs. However, the group reported that sediments are being resuspended and carried through the Detroit River into Lake Erie's western basin. In that basin, mean values of PCBs, DDE and TDE (both residues of DDT) in sediments show a tenfold increase over observed levels in Lake St. Clair, the group stated.

The Reference Group on Pollution from Land Use Activities concluded that activities relating to urban growth (road, sewer and housing construction) contribute to increased erosion, resulting in increased enrichment problems resulting from phosphorus and nitrogen as well as increasing heavy metal concentrations associated with sediments.

Forestry operations, the group told the commission, are not a major contributor to Great Lakes pollution.

The group also proposed a major public information and participation program to encourage open discussion of land use problems before public consultation panels are established to formulate recommendations.

The group's efforts to clarify land use issues and identify potential remedial measures will be ongoing until 1978.

GREAT LAKES WATER QUALITY BOARD

The Great Lakes Water Quality Board reported that progress toward clean water in the Great

Lakes has been "generally slow, uneven and in certain cases disappointing."

Failure of municipalities to meet phosphorus effluent regulations to combat nutrient loadings to the lakes and efforts to recognize and combat new and pervasive toxic chemicals present some of the most pressing problems, the board stated.

The report is the board's last to the International Joint Commission before Canada and the U.S. review the Great Lakes Water Quality Agreement of 1972 next spring.

A total of 113 industrial plants in the U.S. and Canada were named as major waste contributors to 63 major pollution spots in the Great Lakes.

The Ontario companies and their cleanup deadlines are:

December, 1975 — Rio Algom Ltd., Township 150; BASF Wyandotte Corp., LaSalle; Allied Chemical Canada Ltd., Amherstburg.

December, 1976 — Domtar Packaging Ltd., Red Rock; Denison Mines Ltd., Township 150; Abitibi Paper Co. Ltd., Sault Ste. Marie; Algoma Steel Corp. Ltd., Sault Ste. Marie; Imperial Oil Enterprises Ltd. (plant 1 and 2), Sarnia; Dow Chemical of Canada Ltd., Sarnia; Dominion Foundries and Steel Ltd., Hamilton.

December, 1977 — Canada Maltng Co. Ltd., Thunder Bay; Great Lakes Paper Co. Ltd. (new kraft mill), Thunder Bay; Industrial Grain Products Ltd., Thunder Bay; Kimberley-Clark of Canada Ltd., Terrace Bay; Eddy Forest Products Ltd. (unit 1), Espanola; Imperial Oil Enterprises Ltd. (plant 3), Sarnia; Omstead Foods Ltd., Mersea Township.

December, 1978 — American Can of Canada Ltd., Marathon; Steel Co. of Canada Ltd., Hamilton.

December, 1979 — Great Lakes Paper Co. Ltd. (kraft mill), Thunder Bay.

December, 1980 — Eddy Forest Products Ltd. (unit 2), Espanola.

The report said government-owned Polysar Ltd. of Sarnia has inadequate pollution controls that are now being reviewed by the Ontario Ministry of the Environment. Eldorado Nuclear Ltd. of Port Hope is also under investigation by government authorities.

The 63 specific areas of major

pollution problems are six fewer than named before the commission last year, but only because some problem areas were merged. Most are found in the nearshore areas where clean water is most needed for drinking water supplies, recreation and fish.

A major concern of the board was phosphorus levels on both sides of the border.

James Bruce, Canadian chairman of the commission's water quality advisory board, said the cleanup campaign has removed far less phosphorus from the Great Lakes than was expected under targets set by an agreement signed by Canada and the U.S. in 1972.

Even with phosphorus removal systems being installed at sewage treatment plants, the board referred to a need to reduce the material at its source to make headway toward improved water quality.

Also stressed was the need to control other specific sources from the atmosphere and land drainage resulting from both existing and planned industrialization and urban development.

Governments should formulate policy and legislation, the board said, according to the objectives of the water quality agreement.

The board recommended that governments consider an outright ban on phosphates in household detergents. At present, detergent phosphate levels are controlled in Ontario and some border states.

The advisory board report said cities in the U.S. pour three times as much phosphorus into Lake Erie as allowed for in this year's target.

It also recommended full attainment of the 1.0 mg./litre in the effluent from all sewage treatment facilities in the Great Lakes system and that efforts should be made to complete treatment facilities at Detroit and Cleveland by 1980 with phosphorus removal incorporated as quickly as possible.

Major improvements in Lake Erie water quality, the board said, are unlikely until these plants are in operation.

It reported that a total of \$2.5 billion dollars has been committed by the U.S. for sewage treatment plant construction on the Great Lakes. However, federal spending restraints will cause serious problems with the construction grant programs in Minnesota, Ohio and Wisconsin, according to the advisory board.

The board's chief concern in the

area of chemicals included PCBs, Mirex, polynuclear aromatic hydrocarbons (PAHs), heavy metals such as mercury and asbestos fibres.

The board's chief concern for Lake Ontario centred on the bioaccumulation of toxic contaminants such as PCBs and Mirex in fish and wildlife. PCBs, now facing increasingly stringent controls, were found most notably in salmon and eels of Lake Ontario. New legislation to control the chemical on both sides of the border will help, the board stated. But large amounts of PCBs already in the environment, it said, cannot be reasonably collected.

The board reported that the Ontario Ministry of the Environment has warned that traces of the insecticide Mirex, a potential carcinogen, have been found in Lake Ontario fish and that eating more than an occasional meal of such fish could be dangerous to health.

In Lakes Huron and Michigan, PCBs are a major concern, the board reported, while mercury contamination is a problem in the western basin of Lake Erie. In Lake Superior, major concerns include accumulation of PCBs and mercury in fish and high concentrations of asbestos/fibres in the water.

Source identification, control programs and monitoring for these and other toxic materials should be intensified, the board advised.

THE GREAT LAKES RESEARCH ADVISORY BOARD

Research was the focus of the final day of presentations to the International Joint Commission, marking the end of the four-day open session of institutions reporting to the commission under the Great Lakes Water Quality Agreement.

The board presented the results of a review of research activities in the U.S. and Canada to help governments reassess their research priorities. Emphasis in the report was given to PCBs, chlorination of wastewater effluents and incorporation of social and economic factors in water quality decisions.

Water quality objectives for most heavy metals are based on total concentrations of the metals in unfiltered samples, the board told commissioners. The objectives cannot be refined until testing techniques are improved to discriminate among and measure the various forms of metals and until the biological impacts of the various forms are better understood.

By **SANDY NAIMAN**
Ryerson Polytechnical
Institute

Experience '76, the student summer employment program, sponsored by the Ontario Youth Secretariat and administered by Environment Ontario, provides more than 330 students across the province with a chance to do career oriented environmental research. The following are four of a total 69 external programs with an estimated budget of \$700,000.

A University of Guelph insect impact study is an Experience '76 project which involves eight students on jaunts in the woods which may appear to be leisurely butterfly hunts. In reality, these students are investigating harmful and rare species of insects which migrate to southern Ontario from the United States.

Will Husby, the project co-ordinator, explained as he drove out to one of the local collecting sites on the Eramosa River on the Bruce Trail that only the harmful insects are being collected for study and particularly those which due to climatic changes come north from the U.S.



Rita Lapienis is an expert in the art of netting insects and her specimen will be used in the Guelph entomology teaching collection or in a study of migrating insects.

He also explained that insect hunting is a very precarious business. On two seemingly identical days meteorologically you can either find literally hundreds of specimens or else the insects simply aren't around. This day the pickings weren't bad. Rita Lapienis, who has the art of butterfly netting down to a science, complains that much of the time, the bugs are so fast you can hardly net them. Each student carries a knapsack which contains a bottle half filled with cyanide and covered with wax. Each specimen is put into the bottle where it dies in fact.

Experience '76 projects span broad range of environmental studies



Susan Espinet measures a crayfish, as part of a Brock University study of this invertebrate. Samples are taken from Twelve Mile Creek, Gibson Lake and Chippewa Creek.

The other leg of the project is devoted to augmenting the teaching collection of Guelph's environmental biology faculty.

Crayfish make great pets. At least for eight Brock University students, an experience '76 project is proving that. In order to determine the demographics of crayfish, and ultimately, whether or not they can be used for human consumption, more than 3,000 crayfish are living in a lab in the Brock University biology department in St. Catharines. Four days a week, the students are out in the field, either at Twelve Mile Creek, Gibson Lake, or Chippewa Creek collecting samples, which are numbered and branded with soldering irons. Some are put back in their natural habitat, as close to the point at which they were taken and population patterns and migrations are followed. Others are taken back to the lab.

Demography and survival rates in a protected environment are studied. Mating crayfish are separated and put into what project supervisor Martin Tracey calls the honeymoon suite.

Project samples are usually collected during the day, but as soon as

4,000 crayfish have been collected and branded, the students will begin collecting at night, to determine normal foraging range as distinguished from their migrations.

There have been fry, young crayfish, born in captivity in this crayfish colony. Other less fortunate specimens have lost one or both claws. And other small disasters have plagued the students including problems with their water tank systems, soldering irons which are constantly running down, and the ever present threat of being pinched by a rambunctious crayfish.

Besides collecting samples, the students determine growth rates and population rates in the labs, where additional responsibilities include feeding, cleaning tanks, demographic research and recording data.

One of the problems of the study, according to Steve Nemeth, the project co-ordinator who is studying the genetic make-up of crayfish, is that they contract diseases in the lab, where bacteria seem to run rampant. Since the students were not prepared for this, the infections are difficult to treat.



Major Tom Barton, project supervisor and Susan Grady lug garbage cans amid 5000 pounds of municipal refuse in Kingston, which the girl (far right) is sorting into eight categories. This project studies the feasibility of using refuse for domestic heating by pyrolysis/gasification.

In Kingston this summer, there are 12 students vying for a world record. Not in the Olympics, but in the Guinness Book of Records for handsorting more garbage than anyone else in history. But sorting the 250,000 pounds of garbage into eight categories during the 14 week study is not simply for the love of it.

They are involved in an Experience '76 project that may eventually prove the feasibility of burning garbage for domestic heating.

Four days a week, Major Tom Barton of Royal Military College, and his crew of students primarily from Queen's University, go out to the TRICIL plant, near the 401 just north of Kingston and hand sort one hour's worth of garbage collection. A good day, if you can call it that, brings in about 5,000 lbs. and on lighter days the load may be only 3,500 lbs. The refuse comes from higher income residential areas and lower income and commercial areas, on alternating days. Everything is sorted into categories, including, textiles, garden, paper, food plastics, rubber, leather and wood. Records are carefully kept of weight and samples are collected, taken back to RMC and weighed, dried and reweighed.



Janet Otto and Rob Windler plant shrubs in a section of the Lakehead Arboretum in Thunder Bay.

According to Professor Robert Day of Lakehead University's School of Forestry, Experience '75 and '76 grants and the Ministry of the Environment's continuing involvement have made the establishment of an arboretum there a reality.

"We couldn't have done it without the Ministry's help," he said, "we tried it 10 years ago and failed."

An arboretum is like a zoo or botanical gardens, except instead of housing animals or flowers, it's for trees. There are more than 200 kinds of tree species in the Lakehead Arboretum, which was officially opened July 8th, 1976, though it started out as a small nursery, weedy and overgrown.

This year, two students, Guy Hilton and Janet Otto, have continued work on the arboretum started last year. They've brought the nursery back into condition, moved trees, replanted and labelled them, worked in the shop preparing and correcting labels.



Ontario

Ministry
of the
Environment

Hon. George A. Kerr
Minister
Everett Biggs,
Deputy Minister

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Editor D. H. Nagata
 Director of Information Services R. J. Frewin